EPIC Support for the UFS
Ways we support the modeling community

- Support releases and the R2O2R pipeline
- Library management
- Port models to new systems
- End user support and training
- Establish development best practices
- Regression testing
- Configuration management guidelines
- Documentation updates

- Model development
- Workflow development
- GSI to JEDI transition
- Community outreach
- Workflow unification
Weather Model Releases

- Bring research to operations and operations to research (R2O2R)
- Allow researchers and operations to coordinate their work
- Transitioning operational applications into the Unified Forecast Model
Motivation for Releases

- Transparency about code
- Facilitate research
- Enable contributions back to operations
- Provide operational-ready models for private companies as well as system requirements
- For academia, provide additional scientific documentation for research
- Developers also benefit from releases
  - Documentation updates
  - Enhanced portability
  - Updated/improved testing
  - Hardening of code
CCT Release Vision

• Manage repositories using continuous integration and delivery (CI/CD)
  • Minimize work required to testing, documentation, and training
• Perform releases incrementally to capture
  • New libraries, workflows, etc
  • Significant scientific, testing, or programmatic milestones
    • Operational implementations
    • Coinciding with large scale experiments
Upcoming RRFS and SRW Releases

Current Ops
- HRRR
- HREF
- NAM
- RAP

Next Gen Ops Q4 2023

RRFS

SRW

Research Branches
Upcoming SRW Release

EPIC’s Roles

• Coordinate the incorporation of the RRFS capabilities into the UFS Short Range Weather (SRW) App
  • Configuration management, testing, community engagement, documentation
• Incorporate as many RRFS features as possible
• Deploy a set of common libraries (via spack-stack) across platforms for all subcomponents
  • UFS, GSI, Unified Post Processor (UPP), UFS Utilities
• Upgrade spack/spack-stack capabilities to handle new libraries/environments
  • Migrate each of these components to the spack-stack unified environment
• ‘Fix’ the GSI so it will run with newer compilers and migrate it to spack-stack
• Provide demos, training, documentation updates, and end user support
Upcoming HAFS Community Release

Current Ops

HWRF
HMON

Version 1.0
Operational
2022

HAFS-A
HAFS-B

HAFS

Research Repository
Upcoming HAFS Community Release

EPIC’s Roles

• Take over user support forums
• Regression testing with development
• Create a new branch for community development and research
• Keep the research branch synchronized with new operational features
• Maintain/update scientific documentation, training, and demos
• Host developers’ meetings
Upcoming RRFS-Smoke Release

Current Ops

HRRR-Smoke → RRFS-Smoke → SRW

Experimental Release

Research Repository
Upcoming RRFS-Smoke Community Release

EPIC’s Roles

• Develop a workflow for the RRFS-Smoke application
• Merge the workflow into the UFS SRW
• Port to a minimum of Gaea and the cloud platforms
• Enhance SRW initial and boundary condition generation to include Smoke parameters
• Enable regression testing against the FIREX-AQ field campaign
• Create a new branch and/or repository for community development and research
• Update scientific documentation, training, and demos
Releases in a Nutshell

• Releases enable the community’s ability to use and develop various weather applications
• EPIC supports the release pipeline in many ways, including
  • Documentation
  • Demonstrations
  • Workflow development
  • Testing
  • Maintain the R2O2R pipeline
• We appreciate your feedback!
• Take a survey to share your thoughts on releases
Library Management

- Weather applications use many scientific libraries
- Some developed by NOAA, many by external parties
- NOAA-EMC and JCSDA developed separate library deployment systems
  - HPC-stack and spack-stack, respectively
- EPIC manages installs of both on multiple systems and provides testing
- Helping lead effort to transition to the newer, more rigorous spack-stack system
User Support

- Provide demos and trainings
- Building/running UFS models
- Making use of development tools
- Using the cloud to run and develop code

EPIC Workshop
Running the Short-Range Weather App on the Cloud

Natalie Perlin, AGU 2022

Contributing to UFS/EPIC GitHub Repositories
https://github.com/DavidHuber-NOAA/UIFCW_Demo

David Huber, UIFCW
User Support

• Provide demos and trainings
• Answer user questions on UFS forums and issues
  • How to acquire data
  • Building and running applications
  • Questions about the model, components, etc
  • FAQ
User Support

- Provide demos and trainings
- Answer user questions on UFS forums and issues
- Video tutorials (epic.noaa.gov/tutorials)
  - Released quarterly
  - Useful topics for new and existing users/developers
• Every update modifies features
• Guides, walkthroughs, requirements are living documents
  • Building, running
  • Contributing
  • Reviewing
• User feedback also leads to documentation updates
• EPIC tech writers collaborate with developers to keep these documents alive and well!
Configuration Management

UFS Code Change Integration Process

- Notification of issue
  - Yes: Subcomponent CM approvals
  - No: Stage to commit queue
- Jenkins-Cl: ORT pass
  - Yes: Regression test pass
  - No: Pull request
- CM: monitor resource usage across RDHPCs
  - Yes: CM: start merging process with final approvals
  - No: CM: monitor hash and branch update
- UFS Weather Model and App Continuous Integration (CI) Diagram
- Deployment
  - UFS Community Support and Feedbacks

- Data Assimilation Workflow
  - Pull request
    - Yes: Document update
    - No: Development
      - Git issue
      - Yes: CM: monitor HPC stack update requirement
      - No: CM: coordinate with library team
UFS Code Change Integration Process

- Ensure code integration and porting to supported Platforms of UFS WM and Apps consistent with subcomponents
- Review and track the PRs daily, identify issues and Conflicts, work with developers
- Ensure the testing framework reflects the latest development and code changes
- Improve the testing framework to efficiently run baseline regression and workflow End-to-End (WE2E) tests
- Standardize DevOps implementation and optimize code Management strategy
- Build and test pipelines and data management tools
- Develop/maintain Docker images and AMIs
Configuration Management

Jenkins Pipelines to support UFS-WM, SRW, and Land DA

- Regression and workflow end-to-end tests across NOAA RDHPCS and Cloud Platforms
- Implemented through Docker and Singularity container approaches
- Cloud data service through NOAA Open Data Dissemination (NODD) to support UFS baseline tests and case studies
Community Outreach

- Social Media
  - Twitter (@noaaepic)
  - Facebook (facebook.com/NOAAEPIC)
  - Instagram (@noaaepic)

- Conferences
  - UIFCW
  - AGU
  - AMS

- Website
  - epic.noaa.gov
  - epic.noaa.gov/contact-epic

Please take the Release Survey!